

CURRENT LITERATURE.

A new laboratory guide.

Since in these days no teacher of botany finds any entirely satisfactory helps until he himself writes a text-book or laboratory guide, it is not to be wondered at that the schools of pharmacy feel the same needs. Although the new book from the laboratory of Professor Bastin¹ is announced for "colleges and other schools," it is evident that its chief purpose is to meet the needs of students of pharmacy who have no time to study botany as a science, but must be led directly to the essential structures of those plants with which their business will have to do. For such students the book will prove to be a very useful guide in laboratory work. From the college standpoint, however, the usefulness of the book will depend entirely upon the training of the teacher. For students well grounded in a general survey of the plant kingdom, and in the doctrines of modern morphology, the book will be a useful collateral aid in the study of flowering plants. We fear that the pendulum has swung too far from the older botany, and in our eagerness to show that phanerogams represent only one group of plants we are in danger of an almost equally lop-sided cultivation of the lower groups. The phanerogams are still with us, and deserve a more careful study than they often receive in the modern laboratory. Such studies as Professor Bastin indicates are extremely valuable at the end of an elementary course, when the morphology of phanerogams has been approached by way of the lower groups and their variously modified structures become proper objects of study. The general purpose of the book is commendable, and its usefulness has been indicated, but in our judgment its usefulness would have been much enhanced by making it consistent with the universally accepted views of morphology. These views are not any more recondite to a beginner than are the older ones, as we have had abundant opportunity to know. The plates, especially the flower dissections, are to be criticised from the teacher's standpoint as encouraging small and indistinct sketches, the most persistent fault of the beginner. As a matter of personal preference, perhaps, we think that laboratory guides should be small and inexpensive and "handy" books, in which the typographer's pride in paper and margins and binding is inappro-

¹BASTIN, EDSON S.—Laboratory exercises in botany, designed for the use of colleges and other schools in which botany is taught by laboratory methods. 8vo. pp. 540, plates 87. Philadelphia, W. B. Saunders, 1895. \$2.50.

priate. We would raise the question, also, as to the wisdom of the numerous "forms for study." It smacks too much of the swarm of schemes for "plant analysis," which seek to compel the student to observe and think within rigid lines. Our objection is the pedagogical one that the student cannot be compelled too early to cultivate the habit of independence. The criticisms offered are all of minor importance excepting the fundamental one concerning modern morphology, and we cannot but think that even pharmacists would be the better of breathing the air of the modern laboratory, even if they handled no other structures than those indicated.

Mosses of France.

*The Muscologia Gallica*¹ has been completed by the issue of part 14. We have from time to time commented upon this very useful work as it appeared. The fourteen parts have averaged over thirty-two pages of text and nine plates, and have been appearing at irregular intervals since 1884. It is greatly to be regretted that Mr. Husnot did not give us the date of publication of each part, and we hope he will supply this information in the *Revue Bryologique*. The keys accompanying each genus seem good, and are certainly useful; but the want of classification beyond the genera and suborders Acrocarpæ and Pleurocarpæ is unfortunate. The author certainly ought to have given the orders and families a place.

The genus *Orthotrichum*, treated by Venturi, and the § *Harpidium* of *Hypnum*, by Renauld, go far outside the limits of France, or even the *contrées voisines*, and contain much that applies to our own species. This is particularly the case with the latter, which is really a monograph of the group.

The high price of the book will somewhat limit its sale we fear, but its author, lithographer, and publisher in one deserves much credit for his enterprise and financial reward for his labor.

On geographical distribution.

DR. C. HART MERRIAM, in a recent address, distributed as a reprint from *Nat. Geog. Mag.* 6: 229, has given an account of the laws of temperature control of the geographic distribution of terrestrial animals and plants. Dr. Merriam for several years has been investigating, under the Department of Agriculture, the subject of geographic distribution, and the present address is an abstract of the principal results. It

¹HUSNOT, Th.—*Muscologia Gallica*; descriptions et figures des mousses de France et des contrées voisines. Roy. 8vo. pp. 458. pl. 125. Cahen: published by the author. 1884-1894. 70 fr.

is remarked that the question is not one of spreading over all available areas, but how this tendency to spread has been checked. The circumpolar belts of distribution in the northern hemisphere are primarily three: boreal, austral, tropical. These have subdivisions of various rank, the austral, for example, having the transition, upper austral, lower austral subdivisions. The most remarkable case of overlapping is that found on the Pacific coast, where the 1,000 miles from southern California to Puget sound belongs to the transition zone, elsewhere narrow, in which boreal and austral forms freely mingle, and which must account for that wonderfully varied flora. The limitation of these life zones Dr. Merriam finds to be due to temperature as the great primary cause. The two fundamental laws worked out are formulated as follows: (1) the northward distribution of animals and plants is determined by the total quantity of heat, the sum of the effective temperatures (that is, those above the assumed minimum); (2) the southward distribution of boreal, transition, and upper austral species is determined by the mean temperature of the hottest part of the year. The application of these laws to the Pacific coast strip will serve both as an illustration and as an explanation of that remarkable region. The data at hand demonstrate: (1) that the temperature of the summer season is phenomenally low for the latitude and altitude, so low as to enable boreal types to push south to latitude 35° ; (2) that the total quantity of heat for the entire season is phenomenally high for the latitude, so high as to enable austral types to push north to Puget sound. It should be said that the minimum temperature of 6°C . (43°F .), has been assumed as marking the inception of the period of physiological activity in plants and of reproductive activity among animals, and that the total quantity of heat is obtained by adding temperatures above this minimum. Some of the temperature limits made out are as follows: *boreal*, southern boundary, isotherm of 18°C . (64.4°F .), for the six hottest consecutive weeks; *transition*, northern boundary, isotherm with a sum of normal positive temperatures of $5,500^{\circ}\text{C}$. ($10,000^{\circ}\text{F}$.), southern boundary, isotherm of 22°C . (71.6°F .) for the six hottest consecutive weeks; *upper austral*, northern boundary, isotherm with a sum of $6,400^{\circ}\text{C}$. ($11,500^{\circ}\text{F}$.), southern boundary, isotherm of 26°C . (78.8°F .) for the six hottest consecutive weeks; *lower austral*, northern boundary, isotherm with a sum of $10,000^{\circ}\text{C}$. ($18,000^{\circ}\text{F}$.); *tropical*, northern and southern boundaries marked by isotherm showing a sum of $14,400^{\circ}\text{C}$. ($26,000^{\circ}\text{F}$.). The most prominent secondary cause affecting distribution is said to be humidity. Three colored maps of the United States show distribution of total quantity of heat, mean temperature of six hottest consecutive weeks, and life zones. The close resemblance of the maps is remarkable.